

CLAIMS

We claim:

1. A frequency translator comprising:  
5 a circuit board;  
a phase-locked loop circuit comprising a phase detector, a divider, and a voltage controlled oscillator;  
a resonator comprising a surface-acoustic wave device;  
a compliant material positioned between the resonator and the circuit board;  
10 an impedance network operably coupled to the resonator, the network comprising at least one passive device with an electrically conductive lead attached to the passive device;  
a package containing said circuit board and said phase-locked loop circuit; and, said conductive lead being severed.
- 15 2. The frequency translator of Claim 1, said compliant material comprising silicone.
3. The frequency translator of Claim 1, said compliant material comprising a metal or metal alloy filling.
4. The frequency translator of Claim 1, said compliant material comprising  
20 a silver-filled silicone.
5. The frequency translator of Claim 1, said compliant material having a Young's Modulus of less than 1 GPa.
6. The frequency translator of Claim 1, said compliant material having a Young's Modules of less than .5 GPa.
- 25 7. The frequency translator of Claim 1, said package containing a nonvolatile memory.
8. The frequency translator of Claim 7, said nonvolatile memory containing control data to configure a prescaler within the phase-locked loop.

9. The frequency translator of Claim 1 wherein said conductive lead is a portion of printed wiring on the circuit board.

10. The frequency translator of Claim 1 wherein said impedance network is fabricated from a portion of printed wiring on the circuit board.

5 11. The frequency translator of Claim 1, said passive device comprising at least one inductive segment of printed wiring.

12. The frequency translator of Claim 1, said impedance network comprising at least two passive devices.

10 13. The frequency translator of Claim 1, said impedance network comprising five passive devices.

14. The frequency translator of Claim 1, said impedance network comprising at least two passive devices serially connected together.

15 15. The frequency translator of Claim 1 wherein said at least one passive device is a curvilinear portion of printed wiring on the circuit board.

16 16. The frequency translator of Claim 1 wherein said at least one passive device is an inductor.

17. The frequency translator of Claim 1 wherein said at least one passive device is a capacitor.

20 18. The frequency translator of Claim 1 wherein said at least one passive device is a resistor.

19. The frequency translator of Claim 1 wherein said package having a through-hole about said electrically conductive lead.

20. The frequency translator of Claim 1 wherein said phase-locked loop circuit generates about a 622.08 MHZ output in response to about a 155.52 MHZ input.

25 21. A frequency translator comprising:  
a circuit board having frequency translator circuitry mounted to the circuit board and comprising a phase-locked loop having a resonator comprising a surface-acoustic wave device;

a compliant material positioned between the circuit board and the resonator;

at least one passive device coupled to the resonator; and,  
an electrically conductive lead shorting-circuiting at least a portion of said passive device.

22. The frequency translator of Claim 21, said complaint material comprising  
5 silicone.

23. The frequency translator of Claim 21, said compliant material comprising  
a metal or metal alloy filling.

24. The frequency translator of Claim 21, said compliant material comprising  
a silver-filled silicone.

10 25. The frequency translator of Claim 21, said compliant material having a  
Young's Modulus of less than 1 GPa.

26. The frequency translator of Claim 21, said complaint material having a  
Young's Modules of less than .5 GPa.

15 27. The frequency translator of Claim 21, said frequency translator circuitry  
further comprising a nonvolatile memory.

28. The frequency translator of Claim 27 wherein said nonvolatile memory  
contains control data to configure a prescaler within the phase-locked loop.

29. The frequency translator of Claim 21 wherein said frequency translator  
circuitry generates about a 622.08 MHZ output in response to about a 155.52 MHZ input.

20 30. The frequency translator of Claim 21 wherein said conductive lead is a  
portion of printed wiring on the circuit board.

31. The frequency translator of Claim 21 wherein said at least one passive  
device comprising at least one inductive segment of printed wiring.

25 32. The frequency translator of Claim 21 wherein said at least one passive  
device is coupled to another passive device.

33. The frequency translator of Claim 21 wherein said at least one passive  
device is coupled to at least four other passive devices.

34. The frequency translator of Claim 21 wherein said at least one passive  
device is serially coupled to another passive device.

35. The frequency translator of Claim 21 wherein said at least one passive device is a curvilinear portion of printed wiring on the circuit board.

36. The frequency translator of Claim 21 wherein said at least one passive device is an inductor.

5 37. The frequency translator of Claim 21 wherein said at least one passive device is a capacitor.

38. The frequency translator of Claim 21 wherein said at least one passive device is a resistor.

10 39. The frequency translator of Claim 21 wherein said resonator is a surface-acoustic wave device.

40. The frequency translator of Claim 21 wherein said circuit board is contained within a carrier.

41. The frequency translator of Claim 40 wherein said carrier having a through-hole about said electrically conductive lead.

15 42. A method of fabricating a frequency translator circuit having a resonator coupled to at least one passive device and an electrically conductive lead shorting-circuiting at least a portion of said passive device, the method comprising the steps of:  
attached the resonator to a circuit board with compliant material positioned between the resonator and the circuit board;

20 providing a reference frequency to the frequency translator circuit;  
observing an output frequency generated by the frequency translator circuit;  
severing the electrically conductive lead; and,  
observing the output frequency generated by the frequency translator circuit after the conductive lead has been severed.

25 43. The method of Claim 42, said compliant material comprising silicone.

44. The method of Claim 42, said compliant material comprising a metal or metal alloy filling.

45. The method of Claim 42, said compliant material comprising a silver-filled silicone.

46. The method of Claim 42, said compliant material having a Young's Modulus of less than 1 GPa.

47. The method of Claim 42, said complaint material having a Young's Modules of less than .5 GPa.